ENTOMOLOGICAL NEWS

MAY, 1927

ENTOMOLOGICAL NEWS

Vol. XXXVIII No. 5

JAMES H. B. BLAND,
1833-1911

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PHILADELPHIA, PA.
THE ACADEMY OF NATURAL SCIENCES.
Logan Square

Entered at the Philadelphia, Pa., Post Office as Second Class Matter.
Acceptance for mailing at the special rate of postage prescribed for in Section [illegible]
Act of October 3, 1917, authorized January 15, 1918.

ENTOMOLOGICAL NEWS.
ACAD. NAT. SCI.
PHILADELPHIA, PENN'A.

ENTOMOLOGICAL NEWS

published monthly, excepting August and September, by The American Entomological Society.

Philip P. Calvert, Ph.D., Editor; E. T. Cresson, Jr., Associate Editor.

Advisory Committtee: Philip Laurent, J. A. G. Rehn, Chas. Liebeck, J. Chester Bradley, Ph.D., Frank Morton Jones, John C. Lutz, Max Kisliuk, Jr.

The subscription price per year of ten (10) numbers is as follows:

United States and possessions . .	$3.00
Canada, Central and South America .	3.15
Foreign	3.25

Single copies 35 cents

ADVERTISING RATES: Full width of page. Payments in advance.

One issue,	1 in.,	$ 1.20,	2 in.,	$ 2.40,	half page,	$ 4.00,	full page,, $ 8.00
Ten issues	"	11.00,	"	20.00,	"	35.00,	" 70.00

SUBSCRIPTIONS AND ADVERTISEMENTS. All remittances, and communications regarding subscriptions, non-receipt of the NEWS or of reprints, and requests for sample copies, should be addressed to **Entomological News, 1900 Race St., Philadelphia, Pa.**

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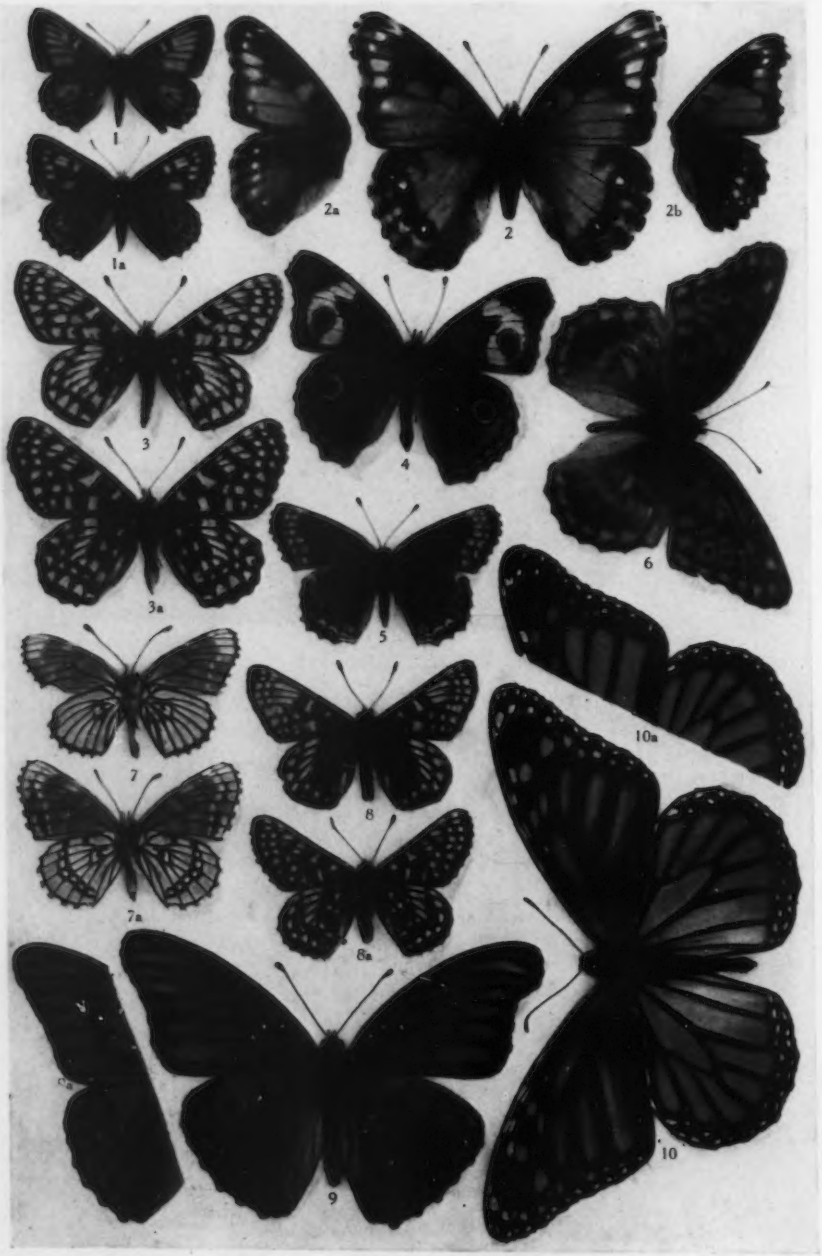

NEW RHOPALOCERA—GUNDER.

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New Transition Forms or "abs" and their Classification (Lepid., Rhopalocera).

By J. D. GUNDER, Pasadena, California.

(With Plate II)

With reference to classification of Lepidoptera in America, I believe we consider a *species* as a prime group of individuals reproducing their own in kind. When a segregated nearby group or a separate far-away group is discovered whose individuals are constantly similar to, yet consistently atypical of, a prenamed group, we term this newer colony a *race*. The words race, variety and perhaps subspecies seem to be identical. Our modern check lists have shunned the old phrase subspecies; variety is somewhat vernacular and used too often in the popular collecting sense of signifing anything different, while race is definitely conclusive and self-explanatory, hence it has a more justifiable acceptance for scientific record and parlance. If existing along with and bred within a species or within a race. are found frequently and continually, deviating individuals which are, as a rule, practically counterparts of one another, then these kinds are called *forms*. Forms may be seasonal, sexual and I might say, evolutionally fixed. Individuals which occur irregularly within a species or within a race and which by change of color or by change of pattern graduate with persistent characteristic similarity from near parental type up to definitely limited variation away from the parental type are called *transition forms*, or are more generally known as "aberrations" or "abs."

The word "aberration" and its slang concept "sport" have always seemed to me to be early entomological misnomers. Their position in the classification of Lepidoptera is certainly not generally understood and their continued long usage, in place of the phrase "transition form," has led some collectors to

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the belief that such specimens are like "freaks" of a "never-to-occur-again" type; whereas, "freaks" have a very different and definite status compared to transition forms. "Freaks" are rarely occurring malformed specimens which depart in some striking manner from their co-constituents due to harmful external agencies. For example, "freaks" are such specimens as: dwarfs (*Cyn. cardui minor* Ckll.); venation malformations (*Dryas cybele bartschi* Reiff. and *Dryas coronis baroni* Edw.); chrysalis burns (see note under No. 11 specimen described herewith); monstrosities and all other ill formations due to a host of unusual causes. Such specimens should not be named and have no place except it may be in the synonymy of their kind for record. Perhaps some day a "butterfly medical book" will appear to cure all ails for the little dears, so at that remote time, a classification of "freaks" will be in order!! Regarding *hybrids* it has been the custom to give names designating the different states of relationship in successive generations by graphically and numerically demonstrating the relationship of two parental lines. The scientific value of these records, made mostly among moths, remain to be seen, as more has been done in Europe that in America with these experiments. Very few hybrids exist by name in our catalogues of diurnals and these will probably be left in *statu quo* for some time to come.

Transition forms or "abs." are of great biological significance. By the frequency of their appearence, one genus may be said to be in a more rapid state of evolutionary change than another. By the aberrant design or the cycle of their color transition, one may foretell what their future witholds or what their past has hitherto left unveiled. Work on these forms can hardly be said to have commenced and the real need at the present time is to classify them into like groups. This would save a piling up of names in the future, fix present types, and at the same time form a basis of real indentification.

Regarding "ab." names. At the present time they are named by their degree of aberrancy; for example, if one row of spots on a specimen was absent, that individual received a name; if

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two rows were absent on another like specimen, it also was given a name; if all the rows of spots were gone on a third specimen, that too was given a title. It is easy to see that all these specimens should be listed under *immaculism,* for they all vary in a like manner, only in different amounts, by degrees. Demonstrating my contention still further: if a specimen was partly black-shaded, on either wings, it received a name; if the upper wings only were all black on another, it got a name; if the lower wings only on still another were all black, it too was christened; and if again still another like specimen was found which was black all over, it was thought quite right to give it a special designation. But all these specimens should fall under one heading, to wit: *melanifusism,* and the name of the first named specimen, regardless of its degree of aberrancy, should, by right of nomenclatorial priority, represent this grade of transition forms, with all other names following in its synonymy. The *Nymphalinae* group show many "abs." listed and under proper classification these names will have to be dealt with in the future something like the following *Euphydryas* species, to wit:

Present Listing—

EUPHYDRYAS

No. 204 chalcedona *(Dbldy. & Hew.)*
ab. fusimacula (*Barnes*)
grundeli (Cool.)
ab. lorquini (*Oberth.*)
suprafusa Comst.
ab. supranigrella *Comst.*
ab. fusisecunda *Comst.*
ab. hemimelanica *Comst.*
ab. mariana (*Barnes*)
ab. omniluteofusca *Gunder*
ab. hemiluteofusca *Gunder*

Future Listing

EUPHYDRYAS

No. 204 chalcedona *(Dbldy. & Hew.)*
tr. form omniluteofusca *Gunder*
hemiluteofusca Gunder

tr. form fusimacula *(Barnes)*
lorquini (Oberth.)
grundeli (Cool.)
suprafusa Comst.
fusisecunda Comst.
tr. form mariana *(Barnes)*
supranigrella Comst.
hemimelanica Comst.

I find that all transition forms definitely divide into two general divisions, those which have "Change of color" and those which have "Change of pattern." There must have been "color" before "pattern," so I place it first, and arrange the sequence of order beginning with black in one and ending with black in the other. Thus:

Change of color—*(pigmental)*	1. melanism *(to black)*
	2. chromatism *(to any spectrum color)*
	3. albinism *(to white)*
	4. pellucidism *(to no color, iridescent)*
	5. immaculism *(lacking design)*
Change of pattern—	6. Albifusism *(white radiation)*
	7. chromatifusism *(color radiation)*
	8. melanifusism *(black radiation)*

The fact of color is the main thought to be kept in mind in an "ab." classification scale. Insects at the equator have practically acquired all the pigmental spectrum colors, while those in our temperate zone are either losing or gaining their share; so color change is a relatively frequent phenomenon among our American diurnals, as is maculation change, though it is less generally understood, there being so many hereditary complications. I have before me upper and under side photographs of 95% of the listed American "ab." types and I find they all fit easily into the above classification. No one species on earth at the present time can have representatives in all eight of the above divisions; even our most aberrant and commonly collected species among the *Euphydryas* can have at the most only three of four, possibly five, representatives in the cardinal grades. Each genus varies in this regard.

The numbers of the figures on Plate II correspond to the numbers placed in front of the species in the text. The size of all the specimens on the plate has been slightly reduced. I have adopted the abbreviation *tr. form,* for transition form, in place of "ab." not only for all the above given reasons, but because it gives to these new specimens and their predecessors an entomological rating more in accord with their true position; a rank by name which they have not held heretofore.

1. **Lycaena editha** Mead (fig. la, ♀), **vanduzeei** ♀ nov. tr. form (fig. 1).

Upper side. Primaries: normal, except for total absence of submarginal row of round black spots. Secondaries: as in primaries, this submarginal row is lacking except for a remnant or spot of reduced size opposite cell.

Under side. Normal. Maculation unchanged.

Classification: Transition form; immaculism; well developed degree.

Data: Holotype ♀; expanse 30mm.; Deer Park, Placer County, California; Type in coll. of the Calif. Acad. of Science, San Francisco, Calif. Named in honor of E. P. Van Duzee, San Francisco.

2. **Cynthia virginiensis** Dru., simmsi ♀ nov. tr. form (fig. 2).

This specimen is a parallel of *Cyn. cardui,* tr. form *elymi* Ramb. (half-fig. 2a) and of *Cyn. caryæ,* tr. form *muelleri* Letch. (half-fig. 2b) in that the region on both upper and under sides of the primaries near the costal margin from the cell is dark with apical white spots fused inward and the lower half of the wing above the inner margin is a clear, normal, red-brown color and free of the usual black designs. The veins of the upper side secondaries are more heavily darkened, especially through the limbal area; the round colored spotting is somewhat blurred; and the lines adjacent to the outer margin indistinct or lacking. On the under side of the secondaries, the ground color of the basal and discal areas is entirely blackish with only the white veins showing, very little of the complicated lattis-work designs in evidence; the two round spots are normal, perhaps somewhat blurred; the lines parallel and near to the outer margin absent or blended.

Classification: Transition form; melanifusism; degree very near final.

Data: Holotype ♀; expanse 52+mm.; Montreal, Canada, Sept. 12, 1913, (H. M. Simms); in coll. of H. M. & F. H. Simms, Stourbridge, Wor., England, to be donated as a gift to the British Museum, London, as its permanent future depository. One paratype ♀, (a lesser degree of *melanifusism*); Raleigh, North Carolina, 1898; in coll. of Am. Mus. of Nat. Hist., N. Y. Named for Mr. Harold M. and F. H. Simms, Stourbridge, Wor., England.

Note: The holotype specimen was mentioned, but unnamed, by Mr. H. M. Simms in the Ent. News, Vol. XXV, p. 33, 1914.

3. **Euphydras chalcedona** D. & H., race **olancha** Wright (fig. 3a, ♀), **malcolmi** ♀ nov. tr. form (fig. 3).

Rows of white spots on both primaries and secondaries of both wings elongated and fused or run-together through their respective interspaces, especially in the discal areas. Similar, for example, to *Euphy. phaeton*, tr. form *superba* Stkr. or *Euphy. chalcedona*, tr. form *fusimacula* Barnes, only in a less aberrant degree.

Classification: Transition form; albifusism; semi-final degree.

Data: Holotype ♀; expanse 44mm.; Casa Diablo, Mono County, California, June 22, 1925; in coll. of Author. Named for Mr. Geo. Malcolm, Los Angeles, Calif.

4. **Junonia coenia** Hbn., **wilhelmi** ♂ nov. tr. form (fig 4).

Typical specimens generally have two spots or ocelli on the upper side of the secondaries. This specimen only has one. The upper spot remains while the lower spot has entirely disappeared, otherwise the specimen is normal on both sides.

Classification: Transition form; immaculism; typical specimens are so constant regarding disappearance of spotting (not irregular spotting) that it is doubtful if a much further degree of immaculism will occur.

Data: Holotype ♂; expanse 44mm.; Los Angeles, California, Sept. 15, 1910, (Schrader); in coll. of Author. A paratype ♀; Los Angeles, Calif., Oct. 15, 1913, (Schrader);

in coll. of Los Angeles Museum, Los Angeles, Calif.; this paratype ♀ is well illustrated in the Bull. So. Calif. Acad. of Sci., Sept.-Dec. issue, 1926, pl. 1, fig. 9. Named in honor of Mr. Wilhelm Schrader of Los Angeles who has been experimenting with the *Junonia* group for years.

5. **Phyciodes orseis** Edw., **edwardsi** ♀ nov. tr. form (fig. 5).

Upper side. Discal and basal areas of both wings melanic inward from submarginal row of roundish red-brown spots (this is the first row following the lunate row at outer margin); reddish cell spotting slightly in evidence through this darkened area.

Under side. Normal, except for slight fusing of color through inner-half area on primaries.

Classification: Transition form; melanifusism; semi-advanced degree.

Data: Holotype ♀; expanse 38mm.; labeled California, no date given; in coll. of Wm. Barnes, Decatur, Illinois. Named in honor of W. H. Edwards.

Note: Normal specimens of this species, together with this tr. form (unnamed) are shown in Comstock's "Butterflies of California."

6. **Euptoieta claudia** Cram., **dodgei** ♀ nov. tr. form (fig. 6).

Upper side. Primaries: cell spots enlarged and wholly black; row of normally lighter colored spots through center discal area become row of corresponding black shaded spots; lunate row and lines at outer margin fused black and not clearly cut. Secondaries: lines at outer margin which normally form clear cut lunate spots become broad, forming fused row of softly shaded spots; just following these, an area of dark fuscous which formerly comprised the position of the round black spots of normal specimens; all spotting of inner-half slightly blurred.

Under side. Primaries especially correspond with the change occurring on the reverse side, in having the cell spots entirely black and with the black row through the discal area. The maculation of the secondaries is slightly blurred, otherwise normal.

Classification: Transition form; melanifusism; of a sufficiently advanced degree to show the tendency of this type which is rare for such a constant species.

Data: Holotype ♀; expanse 60mm.; near Scribner, Dodge County, Nebraska, July, 1885; type in the coll. of Mr. E. A. Dodge, Santa Cruz, Calif., who at a later date may deposit same in the Acad. Coll. at San Francisco. I am pleased to name this specimen in honor of Mr. Dodge of Santa Cruz.

7. **Lemonias alma** Stkr. (fig. 7a, ♀), **koebelei** ♀ nov. tr. form (fig. 7).

Corresponds precisely with *Lem. fulvia,* tr. form *sinefascia* Wms. in lacking all transverse submarginal black lines on under side primaries and submarginal black spot-enclosing band on under side secondaries; however, the cell and basal area maculation remains the same except for absence of heavy black line reaching costal margin on under side secondaries. On the upper side the specimen is normal except for a slight suppression of white maculation throughout the yellow-brown color.

Classification: Transition form; immaculism; degree final as in *Lem. leanira,* form *obsoleta* Hy. Edw. for example.

Data: Holotype ♀; expanse 36mm.; Argus Mts., Inyo County, California, April, 1891; in Koebele coll. at Acad. of Sci., San Francisco, Calif. Named for the late Mr. Koebele of San Francisco.

Note: Regarding the species, it is to be remembered that *Lem. alma* Stkr. has the sub-basal black band, whereas *Lem. fulvia* Edw. is without this maculation. Their aberrations therefore differ in this respect.

8. **Euphydryas bernadetta** Leuss. (fig. 8a, orig. ♂ paratype ♯9), **leussleri** ♂ nov. tr. form (fig. 8).

Rows of white spots on both primaries and secondaries of both wings elongated and fused or run-together through their respective interspaces, especially in the discal areas. Similar, for example to *Euph. phaeton,* tr. form *superba* Stkr. or *Euph. chalcedona,* tr. form *fusimacula* Barnes, only in a less aberrant degree.

Classification: Transition form; albifusism; semi-final degree.

Data: Holotype ♂; expanse 37mm.; near Harrison, Sioux County, Nebraska, June 5, 1919; in coll. of Mr. R. A. Leussler, Omaha, Neb. Named in honor of Mr. Leussler who first discovered this species.

9. **Dione vanillae** L., race **insularis** Mayn. (part-fig. 9a, ♀), **fumosus** ♀ nov. tr. form (fig. 9).

Occasionally specimens occur, more often among females, where the color of the wings is a decided brown instead of the normal yellow reddish-brown. This pigmental change of color is more noticeable on the primaries and outer-half of secondaries; the inner-half of the secondaries along the costal margin retains the normal shade with perhaps a more reddish tint. All maculation remains unchanged.

Classification: Transition form; chromatism (color change from red-brown to brown, the next stage of which would be to black).

Data: Holotype ♀; expanse 77mm.; Los Angeles, Los Angeles County, California, Sept. 15, 1910; in coll. of Author.

Note: Western specimens seem to have this color change more than those from the East. Seitz in his Am. text says some So. Am. specimens are seasonal forms in this regard.

10. **Danaus menippe** Hbn. (cut-fig. 10a, ♀), **americanus** ♀ nov. tr. form (fig. 10).

Upper side. Distinguished from typical specimens on the primaries by having the veins very broadly black practically enclosing their interspaces. The ground color of both wings is a more yellow-brown, instead of red-brown and on the primaries this ground color is darker, being shaded over lightly with black scaling. On the secondaries, the ground color is generally lighter through the basal area and adjacent to the inner margin.

Under side. Ground color of primaries darker. Maculation unchanged.

Classification: Transition form; melanifusism; degree evidently near final, paratypes and others examined being similar.

Data: Holotype ♀; expanse 90mm.; Sunny Glen Ranch, Brewster County, Texas (Poling), July, 1926; in coll. of Author. One paratype ♀; Evanston, Illinois, 1905; in Comstock coll. at Los Angeles Museum, Los Angeles, Calif. (illustrated in Butterflies of California, pl. 17, f. 3, but erroneously labeled *fumosus* H1st.) One paratype ♀; Provo, Utah (Spalding), July 26, 1909; in Barnes coll., Decatur, Illinois.

One paratype ♀; Santa Cruz, Calif., Oct. 15, 1917; in coll. of E. A. Dodge, Santa Cruz, Calif. The Monarch Butterfly is a native of North America, hence the appropriate designation of *americanus*.

11. (not illustrated) **Danaus menippe** Hbn., **nivosus** ♂ nov. tr. form.

The ground color of this specimen is entirely white on all surfaces, no red-brown in evidence. The maculation, veining, etc., remain unchanged and are as in all typical specimens.

Classification: Transition form; albinism; color change final.

Data: Holotype ♂: expanse 87mm.; Jefferson Barracks, Missouri, Aug. 21, 1908; in coll. of Author. A paratype ♀; Mt. Lebanon, Allegheny County, Pennsylvania, Oct. 2, 1921; in coll. of Carnegie Museum, Pittsburgh, Pennsylvania.

Note: I have examined syn. *pulchra* Stkr. at Field Museum, Chicago, and recently Mr. Gerhard kindly sent me photographs of both upper and under sides of it. This specimen is correctly synonymized with the species because the pattern of its partial white color malformation is of irregular disposition on the wings due to chrysalis burn, a malady probably affecting the pupa during its latter stage which results in maldisposition of the pigmental fluids. I also recently examined *fumosus* Hlst. at the Brooklyn Museum, Brooklyn, N. Y., and find it to be a perfectly good type for chromatism, a natural change of color to a darker or different shade. There are a number of examples of *fumosus* Hlst. around the country in collections and I have a fair one in my own. In naming the above nov. tr. form *nivosus*, I have taken into consideration the chance of artificial modification, such as bleaching or fading; neither of these two type specimens exhibit either of these indications. The Pittsburgh paratype was freshly caught and later personally mounted by Mr. Kahl. Albinism is of course a thousand times more common among the *Eurymus* for example, than it is among species of other genera.

For explanation of Plate II, see page 133, lines 1-3.

Some New Species of Coleoptera from Indiana and Florida.

By W. S. Blatchley, Indianapolis, Indiana.

In my collecting in recent years at Royal Palm Park in extreme southern Florida and other points in that State, as well as in southern Indiana, a number of apparently undescribed species of beetles have been taken, eight of which are characterized and named in the present paper. The types of all are in my private collection. The sequence followed is that of the Leng "Catalogue of the Coleoptera of America North of Mexico."

Family Orthoperidae.

Corylophodes flavo-ocellus sp. nov.

Rather broadly oval, convex. Above chocolate-brown, strongly shining, the middle of elytra with a large, rounded, common, sutural, yellowish spot; pronotum with a broad, pale, reflexed, hyaline border; head, antennae and legs dull straw-yellow; under surface reddish-brown, shining. Antennae, as in other members of the genus, 11-jointed, the five joints between the third and basal one of club short, gradually wider. Pronotum with front margin broadly rounded, concealing the greater part of head, its disk and that of elytra impunctate. Tibiae and hind margin of each ventral segment ciliate with a row of stiff seta-like hairs. Length .8 mm.

Royal Palm Park, Florida, April 7. Described from seven specimens beaten from the flowering branches of cabbage palmetto, *Sabal palmetto* (Walt.). Allied to *C. impunctatus* Casey, but that species is more narrowly oval, devoid of yellowish elytral spot, and with ventrals not ciliate. *Type* a male, Royal Palm Park, Florida, April 7, 1925.

Orthoperus aeneocollis sp. nov.

Broadly oval, convex. Head and pronotum a polished purplish-bronze; elytra black with a bluish tinge; antennae brownish, paler at base; legs and under surface piceous-brown. Head with vertex minutely sparsely punctate, its front concave, the clypeal suture deep; clypeus with a low, median, transverse tubercle. Pronotum twice as wide as long, sides margined, broadly curved, basal margin bisinuate, disk minutely sparsely punctate. Elytra conjointly broadly oval, suture not margined, disk distinctly, rather coarsely, thickly, shallowly punctate. Length .8 mm.

Royal Palm Park, Florida, December 7-March 29. Three specimens beaten from fallen dead leaves of the royal palm, *Oreodoxa regia* H.B.K., in the dense hammock on Paradise Key. *Type* from Royal Palm Park, March 29, 1925. The handsome purplish-bronzed head and pronotum, tuberculate clypeus and rather strong punctuation of elytra distinguish this from other known species of *Orthoperus*.

Family ELATERIDAE.

The genus *Melanotus* is represented in southern Florida by numerous species, several of which are as yet undescribed. Examples of all Florida species on hand were sent, in 1921, to R. H. Van Zwaluwenburg, then connected with the U. S. Bureau of Entomology, who was at that time making a critical study of this difficult genus, based mainly on the male genitalia. He returned them with the statement that three of them were very probably new species. A lack of time on my part has since prevented their description. They are therefore named in the present paper.

Melanotus simulans sp. nov.

Elongate, rather slender, sides subparallel. Pale chestnut-brown, shining, everywhere clothed with rather long, prostrate, whitish hairs. Antennae reaching middle of mesosternum, joint 2 subglobose, one-half as long as 3, the latter narrower and slightly shorter than 4. Head, excluding eyes, subquadrate, coarsely, rugosely punctate, front of clypeus broadly rounded.

Pronotum one-third longer than wide, sides parallel, hind angles unicarinate; disk notably convex, minutely, very sparsely punctate, the punctures separated by three or four times their own diameters, each bearing a whitish prostrate hair. Elytra at base not wider than pronotum, thence evidently, but feebly, tapering to apex, disk with rows of close-set rather fine punctures; intervals feebly convex, twice as wide as the strial punctures, each with two rows of minute punctures, from which arise the prostrate hairs. Ventrals finely, evenly aciculate-punctate. Length 9.2—9.4 mm.

Described from two males (one *type*) in the author's collection, taken at Dunedin, Florida, March 15, 1918. Of it Van Zwaluwenburg wrote: "This might be mistaken for *M. angustatus* (Erh.) were it not for the parallel sides of pronotum and the distinct genitalia, which are similar to, but longer than those of *M. morosus* Cand."

Melanotus obscuratus sp. nov.

Elongate, rather robust. Dark chestnut-brown, shining; antennae, pronotum, legs and base of elytra dull red or reddish-brown. Antennae reaching middle coxae, joint 2 subglobose, 3 one-half longer than 2, the two united two-thirds the length of 4. Head coarsely, densely, rugosely punctate; clypeus concave, its front margin broadly rounded.

Pronotum one-half longer than wide, sides parallel from base to apical third, thence feebly convergent or curved to apex; disk at middle strongly convex with sides declivent. finely and sparsely punctate, the punctures separated by twice their diameters; hind angles prolonged, not carinate, their tips truncate. Elytra as wide at base as pronotum, sides subparallel to apical third, thence feebly converging and slightly curved to apex; disk with rows of rather coarse, close-set punctures; intervals flat, only one-half wider than strial punctures, each with two rows of minute punctures, each bearing a rather short, fine yellowish hair. Under surface finely and sparsely punctate, each puncture bearing a prostrate whitish hair. Length 10 mm.

Type a male taken at Ormond, Florida, April 13, 1913. This was returned by Van Zwaluwenburg without comment and labelled "new species."

Melanotus piceatus sp. nov.

Elongate, robust for the genus. Piceous-brown, coarsely clothed with whitish hairs, these longer and prostrate on pronotum, shorter and inclined on elytra; legs and antennae a paler reddish-brown. Antennae reaching middle coxae, joint 2 subglobular, one-half as long as 3, the latter slender, subclavate, as long as 4. Head coarsely, densely rugosely punctate; front of clypeus very broadly rounded or subtruncate.

Pronotum one-fourth longer than wide, sides subparallel, feebly curved near apex; hind angles prolonged, slightly divergent and with a rather long and prominent median carina; disk coarsely and evenly punctate, the punctures dense on sides, on middle separated by more than their own diameters. Elytra as wide at base as pronotum, thence evidently feebly converging to apex; strial punctures of disk relatively small, separated by their own diameters; intervals flat, twice as wide as strial punctures, each with two irregular rows of minute hair-bearing punctures. Punctures of the under surface rather sparse and moderate in size, those of the last two ventrals elongate, coarse and crowded. Length 14—15 mm.

This is a rather common species about Dunedin, Florida, in spring, occurring on flowers of huckleberry and other low herbage and beneath pine blocks and other cover. Taken in copulation April 22. Superficially it resembles our common northern *M. fissilis* Say, but the pronotum is distinctly longer with sides more parallel, and disk more finely punctate. *Type* a male, taken at Dunedin, Florida, March 17, 1922.

In his notes commenting on the species of *Melanotus* sent him, Mr. Van Zwaluwenburg wrote: "I am inclined to think *M. depressus* and *M. parampunctatus* synonyms. The type of the latter is a female, of *depressus*, a male. The separating differences as stated in the original descriptions are apparently sexual." Both were described from Pennsylvania and on the same page[1] by Melsheimer, and if synonyms, the name *depressus* has priority.

Family COCCINELLIDAE.

Scymnus pellio sp. nov.

Elongate-oval, convex. Black, moderately shining, thickly pubescent with short, stiff inclined yellow hairs; head, antennae, legs and two cross-bars on each elytron yellow; these bars widely separated, one extending from near the basal third of suture obliquely to near humerus, its outer end somewhat widened; the other on apical fourth, transverse, its inner end not reaching suture and widened to form a club-like mark or cross-bar; under surface piceous, last two ventrals reddish-yellow. Metacoxal line forming an oblique curve to the first ventral suture and joining the latter. Length 1.3 mm.

Type a male, swept from roadside herbage at Royal Palm Park, Florida, April 2, 1925. Belongs to Horn's group A[2] but differs from all other described members of the group in the position and form of the yellow markings of elytra.

Family CHRYSOMELIDAE.

In 1824 Thomas Say described[3] a *Colaspis 6-notata* and mentioned it as "inhabiting the United States and found in considerable numbers on the common Juniper in July." Say's

[1]Proc. Acad. Nat. Sci. of Philadelphia, II, 1844, p. 151.
[2]Trans. Amer. Ent. Soc., XXII, 1895, p. 87.
[3]Journ. Acad. Nat. Sci. of Philadelphia, III, 1824, p. 445; ibid, Leconte ed. II, 1859, 213.

species is listed in the Leng Catalogue as *Paria canella sexnotata* (Say). It occurs in numbers on Juniper in both Indiana and Florida, is not variable in color, occurs only on Juniper and, in my opinion, is a distinct and valid species. In recent years I have taken on Juniper in southern Indiana another form which, while resembling somewhat in color and markings the *sexnotata* of Say, differs widely in the sculpture of the pronotum and other characters, and which I now describe as

Paria juniperi sp. nov.

Oblong-oval, strongly convex. Head and pronotum reddish-brown, the former often with a vague, median, darker spot. Elytra dull yellow, each with three more or less distinct piceous spots; the basal one oblong, placed near and within the umbone; the others submedian and subparallel, sometimes coalescent, the apex of the inner one projecting behind the other; legs, under surface and basal half of antennae pale reddish-brown, the terminal antennal segments fuscous. Head finely, sparsely, rather unevenly punctate, the front with a short, median sulcus.

Pronotum three-fifths wider than long, side margins broadly curved, front angles obtuse, hind ones rounded; disk everywhere, except on lower flanks and near apex, deeply, coarsely, longitudinally striate-punctate. Elytra with nine rows of rather small punctures, these more or less evanescent on sides and near apex. Under surface sparsely, finely, unevenly punctate. Length 2.8—3 mm.

Crawford and Harrison Counties, Indiana, August 30-September 1. Frequent on Juniper on high wooded slopes near Wyandotte Cave. The sculpture of the pronotum recalls that of *Metachroma quercata* Fab., though the striae are much more coarse. In *P. sexnotata* (Say), the pronotum is finely and very sparsely punctate, and the lower surface of the body is in great part black. *Type* a male taken in Crawford County, Indiana, September 1, 1923. *Paratype* in collection of the Brooklyn Museum, Brooklyn N. Y. The genus *Paria* is sadly in need of revision, several of the forms as *sellata, opacicollis* and *sexnotata*, treated by Leng and others as varieties of *canella* Fab., having a distinct host plant and varying little if any in distinctive color and sculptural characters.

Aphthona schaefferi sp. nov.

Oblong-oval, convex. Color a nearly uniform testaceous or straw-yellow, moderately shining, the last antennal segment alone fuscous. Antennae slender, two-thirds as long as body, joints 2—4 subequal, each slightly shorter than 5—8, which are also subequal, pubescent and feebly clavate, 9—11 thicker, forming a loose club, 11 slightly longer than 10, its tip obtusely pointed.

Pronotum subquadrate, convex, very minutely and sparsely punctate; side margins broadly curved, feebly reflexed, slightly angulate at apical fourth and again near base. Elytra one-third wider at base than pronotum, conjointly elongate-oval; sides parallel to apical third, thence broadly rounded to apex; umbones small but distinct; disk of each elytron with nine rows of evident but small shallow punctures, these evanescent toward apex, the sutural row forking near base; intervals flat, smooth. Ventrals each with a transverse row of very fine punctures, each puncture bearing a slender prostrate hair. Length 2.1—2.3 mm.

Royal Palm Park, Florida, March 30, 1925. Described from 11 specimens taken by sweeping flowers of herbage along the margins of swales on Long Pine Key. It is evidently allied to the Texan *A. socia* Horn, but is larger, with pronotum not wider than long and with elytral punctures in distinct striae. Named in honor of Chas. Schaeffer of Brooklyn, New York, who, by his intensive and critical studies of *Donacia* and other genera of Chrysomelidae, has done much to advance our knowledge of this interesting family. *Type*, a male from Royal Palm Park, Florida.

Entomological Scrap-books of Dr. C. V. Riley.

Mrs. C. V. Riley, widow of Dr. Riley, predecessor of Dr. L. O. Howard as chief entomologist of the U. S. Dept. of Agriculture, has donated to the library of the National Museum the scrap-books of economic entomology which were kept by her husband in the period of his activity from 1865 to 1894. These volumes about one hundred in number contain many articles of great historical interest. In giving these books to the museum, Mrs. Riley wished to have them housed in the same place as the Riley collection of insects. (*Science*, Mar. 18, 1927.)

Concerning Phoresy in Insects.

By L. O. Howard, Washington, D. C.

In 1896, P. Lesne, of the Museum of Natural History in Paris, proposed the name *phoresie*, which has gradually come into use, to describe the carriage of small insects by larger insects without the actual feeding of the smaller upon the larger in the adult stage. The word has been adopted in its French form by several of the European writers, and I used it in the title of a little article in *Entomological News*, volume 34, page 90. It is proposed to give it the English form, *phoresy*. Apparently, in this form it has not occurred in the English language, although the word *phoresis* is used by electricians to express "the conduction of substances dissolved in a liquid through a membrane by means of a current."

Lesne's original observations which led to the coming of this word were made in Algeria in 1893 and were described by him in the Bulletin of the Entomological Society of France for March 25, 1896, pages 162-165. He found a little Borborid fly *(Limosina sacra)* sitting on the back of one of the dung-beetles in some numbers. Although perfectly able to fly, the little flies stayed on the backs of the beetles while the latter were industriously rolling their balls of dung. He could pick up one of the beetles in his fingers without disturbing the flies, but when he attempted to seize one of the latter it showed itself to be very agile. The flies were being transported involuntarily by the beetle to the place where the ball of dung was to be stored, after which, since their larvae are dung-feeders, they would lay their eggs in the dung. In his original article he mentioned several other insects which have somewhat similar habits, and proposed his word *phoresie* to be used for such transportation phenomena where one animal acts as a vehicle to another while at destination this relation ceases.

Of course, somewhat similar phenomena had previously been observed with other insects, notably the triungulin form of the larva of certain blister beetles. In this stage the larva is active, walks readily and attaches itself to the legs and hairs of bees

by which it is carried to their nests where it detaches itself and lives upon honey or other stored food. Considering the whole subject as then known, Lesne makes the interesting suggestion that this porterage may involve the beginning of the evolution of true parasitism and that the Hippoboscid parasites of birds and hairy animals may have begun in this way.

Since the publication of Lesne's paper a number of other comparable instances have come to light. C. T. Brues, for example, in the *Proceedings of the National Academy of Sciences* for February, 1917, describes a very interesting case where certain Scelionid egg-parasites of Orthoptera attach themselves as adults to adult female grasshoppers and are carried by them until they begin to lay their egg-masses, whereupon the adult parasites lay their eggs in the eggs of the grasshoppers. Later, L. Chopard, in the Annals of the Entomological Society of France for 1922, page 240, describes a similar habit on the part of a parasite, of the genus *Riela*, of the praying Mantis. The ovipositor is too feeble to penetrate the egg case of the Mantis, so the adult, by attaching itself to the Mantis, is carried about until the egg-laying begins and is able to oviposit in the Mantid eggs before the egg case is formed. J. Ghesquière, in a brief note in the Bulletin of Agriculture of the Belgian Congo for 1921, described the habits of an egg-parasite of a Coreid bug, which corresponded very closely to the case just described. And Ch. Ferrière, of Berne, Switzerland, has just described another case where an egg-parasite of a different family has acquired the same habit in relation to a Locustid in Java, as studied by Mr. Jacobsen.

The most striking case of phoresy of the type that occurs with the triungulin larva of blister beetles that has been described in recent years is the life history worked out in part by Clausen in Japan (See *Annals of the Entomological Society of America*, XVI, 1923, p. 195). This writer, it will be remembered, showed that *Schizaspidia tenuicornis* Ashm., a species of the very curious Chalcidoid family Eucharidae, lays its eggs by the thousands upon the buds of certain trees. From these

eggs come little larvae which attach themselves to the legs of ants and are carried by them to their nests where they become parasitic upon the larvae and pupae of the ants. This form of parasitic larva, which has been termed *planidium,* was of course discovered in the allied genus *Orasema* by Wheeler in 1907, and in 1912 by H. S. Smith in the larva of *Perilampus;* and hence in these three genera of parasitic Hymenoptera, and possibly also in certain of their relatives, we find this phenomenon of phoresy in the young larva instead of in the adult as in the cases described by Lesne, Brues, Chopard, Ghesquière and Ferrière.

An interesting paper has been published by the latter author in the *Mitteilungen der Schweizerischen entomologischen Gesellschaft,* 1926, p. 489-496, in which he mentions all of these papers, with the exception of the ones by Wheeler and H. S. Smith, and in which he discusses somewhat similar instances among the mites and certain other true insects, where, however, for the most part, the habit of true ectoparasitism is involved.

It seems to the writer that this is a very fascinating line of inquiry which will lead to the discovery of many interesting things. Not only is it worth while to think about the suggestions of Lesne and Ferrière as to the origin of the parasitic habit; but the type of phoresy first recorded by Brues may be found to be not at all rare, especially with the Scelionidae. It is not very likely that these little egg-parasites will often be found attached to the bodies of Orthoptera pinned in collections; but careful examination of living Locustidae may reveal them, and, as Brues' paper shows, they may be found possibly on Orthoptera placed at once into alcohol. Moreover, the study of the biology of the Hymenopterous parasites of the families Eucharidae and Perilampidae will doubtless show many phenomena similar to those studied by Wheeler, Smith and Clausen.*

*Although J. L. King has shown (Annals Entom. Soc. America, vol. 9, 1916, 309-321) that the first-stage larvae of the Dipteran *Pterodontia flavipes* are true planidia, they attach themselves to adult spiders into which they penetrate as internal parasites.

A New Generic Name for Enkrates of Burr (Dermaptera : Chelisochidae).

By JAMES A. G. REHN, Philadelphia, Penna.

A few years ago in discussing the genus *Chelisoches* as found in Africa, and particularly the species *Chelisoches flavipennis*, I pointed out[1] that a misidentification of Fabricius' *Forficula flavipennis* had made the generic name *Enkrates* Burr,[2] erected for that species, a synonym of the much older *Chelisoches*. As emphasized at that time, an analysis of the description of *flavipennis*[3] shows conclusively that the insect before Fabricius was the one later called *Forficula plagiata* by Fairmaire,[4] and not the one to which Burr presumed the name applied, the latter being the species first named *Sphingolabis variegata* many years later by Kirby.[5]

Burr designated the genotype for *Enkrates* as follows, "The only known species is *Enkrates flavipennis* Fabr., from West Africa," which indication was further amplified by the quotation of the original Fabrician reference. In consequence the fate of the generic name is entirely dependent upon the generic position of *flavipennis* Fabricius. As I have already demonstrated[6] this species is properly a member of the genus *Chelisoches*, and consequently *Enkrates* becomes a synonym of that older and much better known genus.

The genus characterized by Burr, and to which he intended to give a new generic name, by his erroneous specific determination remains unnamed. To supply this deficiency I propose the name *Euenkrates*, taking as the genotype the species which Burr had erroneously considered Fabricius' *flavipennis*, *i.e. Sphingolabis variegata* Kirby. The synonymy of this species is as follows:

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[1]Bull. Amer. Mus. Nat. Hist., XLIX, pp. 382-383, 384-385, (1924).
[2]Trans. Entom. Soc. London, 1907, pp. 126, 131, (1907).
[3]Entom. Syst., II, p. 5, (1793). [Sex ?; Senegal.]
[4]In Thomson, Archives Entom., II, p. 257, pl. IX, fig. 3, (1858). [;♀; Gaboon (West Africa).]
[5]Journ. Linn. Soc. London, Zoöl., XXIII, p. 526, (1891), [♀; Sierra Leone.]
[6]Bull. Amer. Mus. Nat. Hist., XLIX, pp. 383-385, (1924).

Euenkrates variegatum (Kirby)

1891. *Sphingolabis variegata* Kirby, Journ. Linn. Soc. London Zoöl., XXIII, p. 526. [♀; Sierra Leone.]
1903. *Chelisoches vittatus* Burr, Ann. & Mag. Nat. Hist., (7), XI, p. 274. [♂: Ogowe, West Africa (type locality); Oguega (Ogrugu), Niger River.[7]]
1904. *Chelisoches limbatus* Borg. Arkiv för Zoologi, I. p. 575, pl. 26, fig. 7. [♂, ♀; Bonge, Cameroons.]
1907. *Enkrates flavipennis* Burr, Trans, Entom. Soc. London, 1907. P. 132. (Not *Forficula flavipennis*, Fabricius.)

I have seen a single male of this species, from Bitje, Ja River, Cameroons, and in the collection of the Academy of Natural Sciences of Philadelphia. The species is one of the Western Forest Province, ranging from as far west as Sierra Leone, east to the Cameroons (Bonge) and French Congo (Ogowe), north to Southern Nigeria (Ogrugu).[7]

Undescribed Pselaphidae Collected by Dr. J. C. Bradley in Panama (Coleoptera).

By FRANK C. FLETCHER, Cornell University.

BIBRAX gen. nov. (Goniacerini.)

Head with a long antennal tubercle, antennae closely approximate at base, geniculate, eleven-segmented. Eyes very feebly developed, composed of but a single facet. Maxillary palpi very short, four-segmented, with the first segment extremely minute, visible only after dissection.

Prothorax unarmed, with basal transverse and lateral longitudinal sulci.

Elytra unarmed, humeri not prominent, discal and sutural striae present, base of each elytron bifoveate.

Abdomen with five visible dorsal and six ventral segments, strongly and broadly margined; first ventral long and fully visible from side to side. Posterior segments of male not emarginate or divided, but modified as described below, female segments simple.

[7]Or Ogrugru, as some authors have it. This record was originally given by Burr as Oguega, Niger River. I feel little doubt as to the correctness of my reference of it to Ogrugu. This locality is on the Anambara tributary of the Niger.

Legs moderate in length, middle coxae subcontiguous, hind coxae approximate, tarsi with a single claw and with a very slender hair-like appendage.

Genotype, Bibrax bradleyi sp. nov.

Bibrax bradleyi sp. nov.

♂. Uniform dark reddish-brown, opaque, legs and antennae slightly paler, palpi light yellow. Slightly depressed, narrowed anteriorly. Vestiture consisting of dense, erect golden pubescence, the hairs recurved at tip.

Head densely and rather coarsely punctured, on the tubercle the punctures become confluent making a rugose surface. Exclusive of the tubercle broader than long, dorsal surface beginning at basal one-fifth raised into a broad, medially slightly canaliculate convexity, from the anterior end of which arises the antennal tubercule; tubercule three-fourths as long as head, subconical, finely carinate dorsally, apex slightly expanded. Sides of head strongly depressed anteriorly. Eyes very feebly developed, consisting of but a single facet, situated on the projecting sides of the head about the middle. Antennae inserted under the tip of the tubercle, geniculate, about one-half as long as body including tubercle, densely clothed with golden recurved hairs which become straighter and longer as the tip is reached; first segment very long, three-fourths as long as the remainder of the antenna, slightly arcuate, second almost one-third as long as first, obconical, third longer than broad. obconical, almost half as long as second, fourth and fifth subequal, subovate, very little longer than broad, sixth to eighth almost globular, eighth slightly smaller than seventh, ninth to eleventh enlarged to form a club, eighth and ninth transverse, eleven as long as broad; narrowed and bluntly pointed at apex. Ventral surface of head grooved along the middle line, with a strong fovea at base; gula on either side convex, on the anterior or buccal margin armed with a strong, sharp, anteriorly pointing tooth. Palpi very short, first segment very small, visible only after dissection, second strongly arcuate, enlarged at apex, third ovate, slightly longer than broad, fourth five-ninths as broad as long, elongate-ovate, obtusely pointed at apex, obliquely truncate at base, with a short thick terminal appendage.

Prothorax convex, slightly broader than long, strongly narrowed behind the middle, with a deep basal fovea on either side and a median one, all connected by an ill-defined sulcus which on either side passes from the lateral foveae to apical three-fourths, forming prominent rounded lobes on the pro-

thoracic sides; median fovea connected with the base by a channel; no median sulcus. The entire surface densely and irregularly punctate, the lateral protuberances very finely punctured. Surface entirely covered with dense, erect, golden pubescence, the tips of the hairs recurved.

Elytra broader than long, regularly narrowed from apex, narrower at base than thorax, five-sevenths as long as abdomen, humeri not prominent. Surface convex, each elytron with two foveae at base, discal stria deep and broad in basal half, but from then on becoming fainter to apex, its bottom with a row of punctures; sutural stria broad and ill-defined, likewise provided for its entire length with a row of punctures.

Abdomen gradually narrowed from base to apex; first three, visible, dorsal segments equal, fourth longer; first four ventral segments about equal, the fourth flattened and shining in the middle, fifth longer than the others with a large, transverse, shining, and well-defined depression, last with a deep circular fovea apically. All dorsal segments strongly and longitudinally convex, their separation strongly marked; side margins limited within by a deep groove, the area between which and the edge very convex.

Legs moderately long, front and middle coxae subcontiguous, hind coxae approximate; all the femora clavate, the middle femora articulating close to the coxae; front tibiae arcuate, inflated, inner surface concave for the entire length, this concavity is polished and limited on either side by a fine carina, within which is a row of minute bristles; middle and hind tibiae straight. Third tarsal segment about two-thirds as long as second, provided with a single claw, but with a very slender hair-like appendage.

Length 2.5 mm. Breadth, .8 mm.

♀. In all respects similar to the male described above, except that the ventral segments are all evenly convex and lack depressions of any kind.

Described from one male and one female collected in April, 1924. by Dr. J. C. Bradley, on Barro Colorado Island, Gatun Lake, Canal Zone, Panama, and to whom I take pleasure in dedicating this very interesting little beetle.

Types in the collection of Cornell University, Holotype No. 766.1 ♂, Allotype No. 766.2 ♀.

Bibrax is a very isolated genus in the tribe Goniacerini and is not at all closely related to any other described genus. The strongly margined abdomen and eleven-segmented antennae necessitate placing it in the vicinity of the Ethiopian genus

Ogmocerus with which otherwise it has but little affinity. It differs from *Ogmocerus* in the much more strongly developed antennal tubercle, small eyes, male modifications of the abdomen, sub-contiguous middle coxae, and many other characters.

There is a very strong superficial resemblance to some of the Metopiini, particularly to *Metopiellus hirtus* (Reitt.) in the general facies, inflated front tibiae, small eyes, and the relative length of the last two tarsal segments, but the single claw, fully visible first ventral segment, equal number of segments in the two sexes, the undivided last segment in the male, and the type of modification of the last three in the same sex forbids any such association.

Raffray has shown (Ann. soc. ent. France. 1890. 59: 317) that the Goniacerini do not invariably possess three-segmented palpi as he first supposed, but for some reason he failed to indicate this in the generic and tribal characterizations in the *Genera Insectorum,* though four segments are figured in the palpus of *Ogmocerus giganteus.*

Euphalepsus panamensis sp. nov.

Form strongly ventricose; rufo-castaneous throughout, palpi light-yellow; pubescence rather sparse, pale, and recurved.

Head about as long as wide; frontal tubercles prominent, sides with a few large punctures posteriorly, otherwise the surface of the head is impunctate; front depressed, vertex with a scarcely noticeable depression; on a line passing through the posterior margins of the eyes there are on each side, two extremely minute pore-like foveae separated from one another only by a very thin lamina, the foveae being scarcely as large as the coarse punctures of the antennal tubercles. Eyes large, convex and prominent. Antennae with a gradually-formed club, first segment cylindrical, longer than the others, second subquadrate, longer than the remaining segments of the funicle, third obconic, about as long as wide, fourth to eighth transverse, gradually very slightly broader, these subequal in length, ninth and tenth transverse, eleven oblong-ovate, longer than the two preceding, the last three broader than the preceding forming a feebly differentiated club.

Prothorax gibbous, as long as broad, slightly narrowed at base, very much so at apex, much narrower than the elytra; basal portion with a transverse, deep and arcuate sulcus not dilated at middle; the sulcus connects on either side with a broad deep fovea from which a deep and well-marked sulcus extends anteriorly to half the length of the prothorax; a very

fine carina present between base of prothorax and the transverse sulcus.

Elytra strongly convex, much broader then long; base strongly quadrifoveate, with a sharp carina, which on either side extends on to the elytra in a well-marked humeral callus which ends abruptly and does not extend further as a carina; discal stria lacking, sutural stria entire; surface clothed with golden recurved hairs more sparsely placed than on the prothorax.

Abdomen equal in length to the elytra, regularly rounded to the apex; first dorsal segment longer, the rest subequal; a broad and deep fovea present on either side at the lateral margins of the base of the first dorsal segment.

Length 1.6 mm. Breadth .9 mm.

Described from one female specimen collected in April, 1924, by Dr. J. C. Bradley, on Barro Colorado Island, Canal Zone, Panama. *Holotype* in the collection of Cornell University, No. 767.

Panamensis is a member of Raffray's group II, containing three heretofore described species, namely, *rugipes* Raffray from Venezuela, *globipennis* Reitter from Mexico, and *humeralis* Raffray from Colombia.

From *rugipes, panamensis* is easily known by its much smaller size, by the very small and peculiarly formed foveae of the head, and by the transverse thoracic sulcus not being dilated or foveate at the middle.

From *globipennis* it differs in its much smaller size, noncarinate prothorax, the transverse ninth and tenth antennal segments, etc.

From *humeralis* to which it is most closely related, it may be distinguished by its smaller size, very feeble fovea of the vertex, the peculiar foveae of the head, and the absolutely smooth elytra.

Beneficial Insects Trapped in Bait-pails.

By S. W. Frost, Arendtsville, Pennsylvania.*

In operating bait-pails as traps for the adults of the oriental fruit moth (*Laspeyresia molesta* Busck.), many insects were captured including beneficial, injurious and forms otherwise

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classified. Some of the Lepidoptera and Coleoptera were, at times, so numerous that they interfered with the operation of the baits. A future paper will be devoted to rare and interesting insects recovered from bait-pails, but at present, beneficial insects are most important and have an economic bearing upon the problem of bait-pails as a means of control not only for the oriental fruit-moth but also for any pest where such baits may seem practical.

This paper is not confined to the predaceous and parasitic enemies of the oriental fruit-moth but to all beneficial insects that might be reduced in numbers through the use of liquid-baits. Comparatively few have been found in appreciable numbers and only species of Chrysopidae have been trapped in sufficient abundance to be concerned in the practical use of such baits. The insects show a decided preference for certain types of baits. Honey-bees, for example, prefer water or sugar solution, Syrphidae seem to like baits of low grade molasses, while Chrysopidae were taken abundantly in all baits but show a preference for sweet baits rather than water.

The insects in question were caught during the summer of 1926 from four hundred and thirty bait-pails placed in a peach orchard near Arendtsville, Pa. The baits consisted of various mixtures, chiefly sugar and molasses solutions, although several weak acids and other mixtures were used. They were duplicated at different times during the season so that a particular type of bait was in operation throughout the entire summer from May to November. Variations exist due to the age of the bait, dilution, etc. All baits were examined once a week and the insects strained from them and taken to the laboratory for further examination and classification.

Adalia bipunctata (L.) and other beneficial Coccinellidae were taken occasionally from baits but in numbers noticeably insignificant.

Syrphidae were trapped in comparatively small numbers. During the early part of the summer, *Ferdinandea dives* O. S. was fairly common while later in the season several other species were taken. In July a single specimen of *Volucella vesiculosa* Fab. was captured. Mr. Charles T. Greene has further identified specimens of *Syrphus ribesii* Linn., *Mesogramma*

polita Say and *M. marginata* Say, which were taken from bait-pails. None of the Syrphidae, however, were taken in abundance.

Honey-bees were found in bait-pails throughout the entire season, especially during the warmer parts of the summer in August and September. Their numbers were comparatively small. Many were trapped by sugar baits or by weak acids but only a very few by molasses baits. A set of five pails, containing a high-grade molasses bait, was placed in a small block of quince trees within a radius of ten feet from bee-hives. Only three bees were caught between May 5th and August 18th, although the baits were kept in prime by the addition of new molasses about every two weeks. It would seem, therefore, that molasses baits are entirely safe in the proximity of bee-hives.

A species of Hemerobiidae was found in bait-pails in small numbers during the latter part of the summer. As little is known concerning the feeding of the adults of this family, these records may prove interesting.

Several species of Chrysopidae were attracted to baits in large numbers, some pails caught as many as fifty during their operation. Three species: *Chrysopa nigricornis* Burm., *C. rufilabris* Burm., and *C. quadripunctata* Burm., were determined by Dr. Roger C. Smith. A fourth species may be included, *C. interrupta* but the loss of color due to the action of the bait and the preservative made it impossible to make an absolute determination. The majority of the adults were females. Smith (1922)* refers to a difference of opinion concerning the feeding of the adults and remarks that he found them to relish water and sugar solution. The enormous numbers captured by sugar and molasses baits, and on the other hand, the comparatively few captured by plain water, clearly shows that *Chrysopa* is readily attracted to sugar and molasses solutions.

An attempt was made to determine whether parasitic insects, especially the parasites of the oriental fruit-moth, were attracted by these baits, but the percentage of parasitism was low during 1925 and 1926 and few parasites were recovered

*Cornell Memoir 58:1328, 1922.

from baits. This phase of the problem needs further investigation.

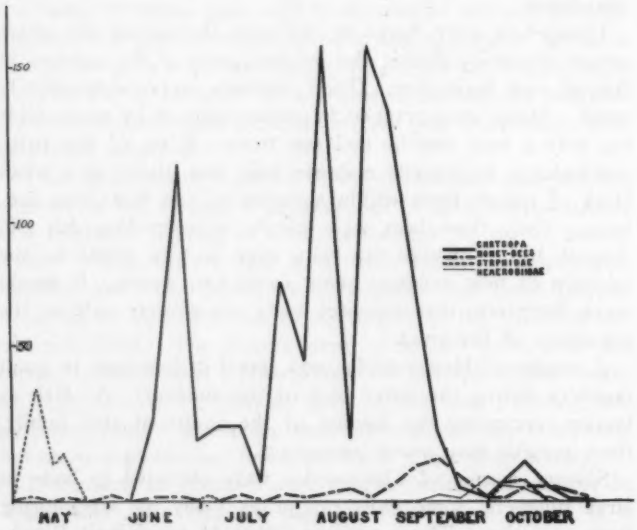

Chart showing the comparative numbers of beneficial insects trapped by baits.

Summary of Beneficial Insects Taken in Bait-pails in 1926.

INSECT	Low grade molasses 85 pails	High grade molasses 90 pails	Sugar baits 50 pails	Sodium[1] baits 100 pails	Acid[2] baits 60 pails	Misc.[2] baits 40 pails	Water 5 pails	Total Number Insects
Honey Bees	7	17	20	18	4	6	2	74
Syrphidae	64	1	0	11	0	0	0	79
Hemerobiidae	0	2	13	3	0	0	1	19
Chrysopidae	133	309	194	241	6	54	4	941

From these notes it is evident that bait-pails can be used with comparative safety without attracting beneficial insects in alarming numbers. While Chrysopidae were trapped in considerable numbers, it is not definitely known that the adults are predaceous. A further knowledge of the percentage of males and females trapped, as well as the number of gravid females caught, would be necessary to settle the point. Sugar baits should be avoided in the proximity of bee-hives.

[1] Consisting of 1 part molasses, 10 parts water with the addition of sodium salt as a preservative.

[2] These baits were continued for only a few weeks.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., MAY, 1927.

Should Insect Collections be Passed on to Individuals?

By S. A. ROHWER, U. S. National Museum.

In the December number (pages 329-332) of *Entomological News*, under the title "Concerning the Insect Collection," Dr. Melville H. Hatch propounds the rather novel question as to whether it would not be advisable to pass on large collections from one individual worker to another. It is a rather interesting idea, but is probably stimulated by the enthusiasm of youth. It is very difficult to determine whether a man in the early twenties or thirties is going to continue investigations on any of his pet hobbies, and should he at this age elect to become a specialist in any particular group of insects, this desire would probably dominate his work for a number of years to come. But as time goes on, he might accept a position in some institution of such a character that it would be impossible for him to carry on intensive investigations in the line of activity he had chosen, and the collection which had been given to him for safekeeping by one of his predecessors would lie in a dormant condition and perhaps would not even be satisfactorily cared for for many years. It is very rare, when an individual elects a group in which he desires to become a specialist, that he is willing to admit he has to give up his work in this group because of the pressure of other duties; and I can foresee that should the plan suggested by Dr. Hatch be accepted and put into practice, we would see many of the larger collections in the hands of individuals who are no longer active but who always dream that they will some day get back to doing real work in their chosen field.

Another drawback to the suggestion made by Dr. Hatch is that a collection, when placed in the custody of an individual, is not as available to other workers as it is when it is placed in the custody of some public institution. Many of us can well

remember when certain specialists have wished to consult collections of individuals to examine the types and were told that they could do so only under the most rigid conditions and at certain specific times. This is, of course, a very serious drawback to placing collections in the hands of individual workers, because it does not lend itself to free investigation by other students and tends to make it possible for one individual to monopolize the work done on any particular unit.

Collections of insects that were formed as the basis of treatises or descriptions could hardly be considered as private property. They are rather the property of Science, and the holder of this collection is only the custodian, and as such he should not only satisfactorily preserve these specimens, but he should make them available for examination by other students of the same group.

Even with all the safeguards suggested by Dr. Hatch, it seems to me that the three considerations suggested above indicate very conclusively from the standpoint of science that it is undesirable to pass on collections from one individual to another. We will grant momentarily that it is certainly an advantage to the individual worker, but as suggested in my recent address before the members of the Entomological Society of America and as very aptly brought out by Dr. Hatch, the taxonomic work in the future must be done at institutions containing large collections rather than at the hands of individual investigators who cannot afford to build up or house an extensive collection. Institutions having the custodianship of extensive collections should be so well provided with space, equipment and personnel as to make it possible for young students to derive full benefit from these collections.

Entomological Expedition in Patagonia.

An entomological expedition in which the Departamento Nacional de Higiene, Buenos Aires ,and the British Museum of Natural History, London, participated, was recently effected in the little explored forested regions of northwestern Patagonia. The region investigated extended from Lago Nahuel Haupi, across the Andes to Port Mouatt, thence to Chiloe Island and from there northward into Chile to San-

tiago. The party consisted of F. W. Edwards (British Museum), M. F. Edwards, E. S. Shannon, R. C. Shannon (formerly of the Dept. of Agriculture, Washington, D. C.) and E. del Ponte (the last two being the members from the Dept. Nacion. de Higiene). An attempt was made to collect all orders of insects, but particular attention was given to the Diptera. Representatives of 58 families of this order were taken among which are many genera which are common only to Patagonia and New Zealand; some others are likewise common to these countries and to Tasmania and Australia as well. A more complete report will appear in the *Revista del Instituto Bacteriologico*, Buenos Aires. (*Science*, April 1, 1927.)

Prodiaphania, New Name for Diaphania Macquart (1843) Preoccupied (Dipt., Muscoidea).

The new generic name PRODIAPHANIA is here proposed for the muscoid genus *Diaphania* of Macquart, whose genotype is *Diaphania testacea* Macquart, of Australia, described in 1843, in the Dipteres Exotiques, II, 3, 277-8, pl. 14, f. 8. The name *Diaphania* was proposed by Hübner, in 1816, for a genus of Pyralidae (Lepidoptera), which preoccupies Macquart's use of it. CHARLES H. T. TOWNSEND.

Entomological Literature

COMPILED BY E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

Papers of systematic nature will be found in the paragraph beginning with (N). Those pertaining to Neotropical species only will be found in paragraphs beginning with (S). Those containing descriptions of new forms are preceded by an *.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Papers published in the Entomological News are not listed.

1—Trans., American Ent. Soc., Philadelphia. **9**—Entomologist, London. **10**—Proc., Ent. Soc., Washington. **17**—Ent. Rundschau, Stuttgart. **21**—The Entomologist's Record, London. **22**—Bull. of Ent. Research, London. **26**—Ent. Anzeiger, Wien. **28**—Ent. Tidskrift, Upsala. **33**—Bull.

et An., Soc. Ent. Belgique. **34**—Mem. Soc. Ent. Italiana, Genova. **42**—Ent. Meddelelser, Kjobenhaven. **50**—Proc., U. S. National Museum. **59**—Encyclopedie Entomologie, Paris. **60**—Stettiner Ent. Zeitung. **64**—Zeit. Oesterr. Ent. Ver., Wien. **69**—Comptes R., Acad. Sci., Paris. **80**—Lepid. Rundschau, Wien. **81**—Folia Myrmec. et Termit., Berlin. **100**—Proc. Acad. Nat. Sci., Philadelphia. **120**—Ann., Naturh. Mus., Wien. **150**—Jenaische Zeit. f. Naturwissenschaft. **154**—Zool. Anzeiger, Leipzig.

GENERAL.—Cockerell, T. D. A.—Natural history [of Colorado]. Arthropods. (History of Colorado, Chap. 4, p. 172-185.) **Emery, C.**—Obituary and bibliography. (**34**, iv, p. 201-222, ill.) **Gribodo, G.**—Obituary and bibliography. (**34**, iv, p. 223-228.) **Hubault, E.**—Contribution a l'etude des invertébrés torrenticoles. (Suppl. Bul. Biol. Fr. et. Belg., ix, 388 pp., ill.) **Poche, F.**—Bemerkungen zu dem "report of the British national committee on entomological nomenclature." (**26**, vii, p. 11-15, cont.) **Scheerpeltz, O.**—Das abbilden entomologischer objekte und präparate. (**26**, vii, p. 3-7, ill, cont.) **Sevastopulo, D. G.**—Effect of naphthaline on larva. (**9**, lx, p. 66.) **Sich, A.**—On nomenclature. (**21**, xxxix, p. 42-43.) **Thurner, J.**—Einige interessante entomologische begebenheiten. (**64**, xii, p. 6-7.)

ANATOMY, PHYSIOLOGY, ETC.—Bledowski u. Krainska.—Die entwicklung von Banchus femoralis. (Bibl. Univ. Lib. Polonae, 1925, Fasc. 16, 50 pp., ill.) **Cappe de Baillon, P.**—La descendance des monstres doubles de Phasmides origine des intersexues. (**69**, clxxxiv, p. 625-626.) **Gerould, J. H.**—Studies in the general physiology and genetics of butterflies. (Quart. Rev. Biology, ii, p. 58-78, ill.) **Knoll, F.**—Insekten und blumen. Heft. 3. Die arumblütenstände und ihre besucher. Über den blütenbesuch der honigbiene. Die erfolge der experimentellen blütenökologie. (Abh. Z.-Bot. Ges., Wien, xii, p. 383-645, ill.) **Ljungdahl, D.**—Nagra puppbeskrivningar. (**28**, xlvii, p. 184-199, ill.) **McIndoo, N. E.**—Senses of the cotton boll weevil; an attempt to explain how plants attract insects by smell. (Jour. Agric. Res., p. 1095-1139, ill.) **Pruthi, H. S.**—The influence of some physical and chemical conditions of water on may-fly larvæ (Cloëon dipterum.). (**22**, xvii, p. 279-284, ill.) **Pruthi, H. S.**—Prothetely in insects. (Na-

ture, cxix, p. 391-392.) **Przibram, H.**—Kopftransplantationen bei insekten. **(154,** lxx, p. 166.) **Weber, H.**—Das problem der gliederung des insektenthorax. Das labialsegment und das grundschema das insektenthorax. **(154,** lxx, p. 105-126, ill.) **Wheeler, W. M.**—The physiognomy of insects. (Quart. Rev. Biology, ii, p. 1-36, ill.)

ARACHNIDA AND MYRIOPODA.—Cameron, A. E.—A local outbreak of the winter or moose tick, Dermacentor albipictus, (Ixodoidea) in Saskatchewan. **(22,** xvii, p. 249-257, ill.) **Verhoeff, K. W.**—Bronns Klassen und ordnungen des tier-reichs. Bd. 5, Abt. 2, Buch 2: Diplopoda, p. 129-480, ill.

(S) ***Roewer, C. F.**—Opilioniden aus süd-amerika. (Bol. Mus. Zool. Anat. Torino, xl, No. 34, 34 pp., ill.)

THE SMALLER ORDERS OF INSECTA.—(N) **Byers, C. F.**—An annotated list of the Odonata of Michigan. (Occ. Pap. of the Mus. of Zool. Univ. of Mich. No. 183, 1-15 pp., ill.)

ORTHOPTERA.—(N) ***Hebard, M.**—A remarkable new genus and species of decticid from Liberty County, Florida (Tettigoniidae). **(1,** liii, p. 1-4, ill.) **Hebard, M.**—Fixation of the single types of species of orthoptera described by Cyrus Thomas. **(100,** lxxix, p. 1-11.)

HEMIPTERA.—(S) ***Jensen-Haarup, A. C.**—Preliminary descriptions of new Hemiptera in the collections of the zoological museum of Copenhagen. **(42,** xvi, p. 41-56.)

LEPIDOPTERA.—Ander, K.—Om larven till Pyrrhia umbra. **(28,** xlvii, p. 79-82, ill.) **Meyrick, E.**—Hereditary choice of food-plants in the lepidoptera and its evolutionary significance. (Nature, cxix, p. 388.) **Röher, A.**—Ueber zweck und ursache der geselligen lebensweise bei raupen mancher schmetterlingsarten. **(80,** 1927, p. 52-56.) **Rocci, U.**—Ricerche sulle forme del gen. Zygaena. **(34,** iv, p. 154-176, ill.)

(S) ***Bouvier, E. L.**—Nouvelles contributions a la connaissance des Saturnidae. **(59,** (B) ii, p. 15-32, ill.) **Cockerell, T. D. A.**—A new subspecies of Papilio paeon. **(10,** xxix, p. 48.) ***LeCerf, F.**—Lépidoptères nouveaux du muséum d'histoire naturelle de Paris et notes diverses.

(59, (B) ii, p. 44-48, cont.) **Schuster von Forstner, W.**—Die falterwelt der Galapagos-Inseln. (17, xliv, p. 7.) **Spottau Eulau, O.**—Erinnerungen au Süd-Amerika [Another part of this work (pp. 50-64) has appeared with Insektenbörse for 1927, Nr. 6.]

DIPTERA.—Abbreviations of Muscoid characters.—In Supplementa entomologica, Nr. 14, p. 39-42, Dr. C. H. T. Townsend states under the above title "In future all muscoid descriptions and synopses by the author will be abbreviated according to the following list:" He then gives three pages of abbreviations. All students of diptera likely to use Dr. Townsend's papers should have access to this list. **Feuerborn, H. J.**—Ueber chaetotaxis und typus der larve und puppe von Psychoda. (154, lxx, p. 167-184, ill.) **v. Frankenberg, G.**—Verlagerung einer schwimmblase in den ausgestülpten pharynx bei der larve von Corethra. (154, lxx, p. 127-134, ill.) **Hertig & Hertig.**—A technique for artificial feeding of sandflies (Phlebotomus) and mosquitoes. (Science, lxv, p. 328-329.) **Johnson, C. W.**—Some remarks on questionable types. (10, xxix, p. 45-46.) **Kunike, G.**—Experimentelle untersuchungen über die möglichkeit der uebertragung der maul-und klauenseuche durch fliegen. (Centralb. Bakt. Par. u. Infekt., Jena, cii, p. 68-81.) **Petzold, W.**—Bau und funktion des hypopygiums bei den tachinen, unter besonderer berücksichtigung der kieferneulentachine (Ernestia rudis). (150, lxiii, p. 1-50, ill.) **Roubaud, E.**—Sur l'hibernation de quelques mouches communes. (25, 1927, p. 24-25.) **Shannon, R. C.**—On the characteristics of the occiput of the diptera. (10, xxix, p. 47-48.)

(N) ***Dyar & Shannon.**—The North Am. two-winged flies of the family Simulidae. (50, lxix, Art. 10, 54 pp., ill.) ***Kröber, O.**—Die Chrysops-arten Nordamerikas einschl. Mexicos. (60, lxxxvii, p. 209-353, ill.)

(S) ***Borgmeier, T.**—Phorideos myrmecophilos da Argentina. (Bol. Mus. Nac. R. d. Janeiro, ii, No. 3, p. 1-33, ill.) ***Brethes, J.**—(See under Coleoptera). ***Duda, O.**—Monographie der Sepsiden. Neotropische region. (120, xl, p. 79-95, ill.)

COLEOPTERA.—Falkenström, G.—Beiträge zur kenntnis der biologie der halipliden und der metamorphose von

Haliplus immaculatus. **(28,** xlvii, p. 1-28, ill.) **Kemner, N. A.**—Spinnende tenebrioniden-larven. **(28,** xlvii, p. 65-78, ill.) **Kemner, N. A.**—Zur Kenntnis der staphylinidenlarven. **(28,** xlvii, p. 133-170, ill.) **Richmond, E. A.**—Olfactory response of the Japanese beetle, Popillia japonica. **(10,** xxix, p. 36-44.) **Withycombe, C. L.**—The South American boll-worm of cotton (Sacadodes pyralis.) **(22,** xvii, p. 265-271, ill.)

(N) ***Buchanan, L. L.**—A review of Panscopus (Otiorhynchidae). **(10,** xxix, p. 25-36, ill.) **Tanner, V. M.**—A preliminary study of the genitalia of female coleoptera. **(1,** liii, p. 5-50, ill.)

(S) ***Brethes, J.**—Un coleoptere et un diptere nouveaux de la Georgie du Sud. (Com. Mus. Nac. Hist. Nat. Buenos Aires, ii, p. 169-173, ill.) ***Chapin, E. A.**—The beetles of the family Cleridae collected on the Mulford biological exploration of the Amazon basin. **(50,** lxxi, Art. 2, 10 pp.) ***Kleine, R.**—Neue gattungen und arten aus der familie Brenthidae. **(60,** lxxxvii, p. 354-372, ill.) ***Kriesche, R.**—Neue Lucaniden. **(60,** lxxxvii, p. 382-385.) ***Marshall, G. A. K.**—New injurious Curculionidae. **(22,** xvii, p. 199-218, ill.) ***Moser, J.**—Beitrag zur kenntnis der Melolonthiden. **(60,** lxxxvii, p. 198-208.) ***Théry, A.**—Recherches synonymiques sur les Buprestides et descriptions d'espèces nouvelles. **(33,** lxvii, p. 33-48, ill.)

HYMENOPTERA.—Bugnion, E.—Les pièces buccales, le sac infrabuccal et le pharynx des fourmis. **(81,** i, p. 59-71, ill.) **Karawajew, W.**—Ein fall von lateralem hermaphroditismus bei ameisen und ein fall defekter körperbildung. **(81,** i, p. 45-47.)

(N) **Bluthgen, P.**—Beiträge zur systematik der bienengattung Sphecodes. (Zool Jahrb., Syst., liii, p. 23-112, ill.) ***Muesebeck, C. F. W.**—A revision of the parasitic wasps of the subfamily Braconinae occurring in America, north of Mexico. **(50,** lxix, Art. 16, 73 pp., ill.)

(S) ***Reichensperger, A.**—Eigenartiger nestbefund und neue gastarten neotropischer Solenopsis-Arten. **(81,** i, p. 47-51.) ***Rohwer, S. A.**—Some scoliid wasps from tropical America. (Jour. Wash. Ac. Sci., xvii, p. 150-155.) ***Santschi, F.**—A propos du Tetramorium caespitum. **(81,** i, p. 52-58.) ***Santschi, J.**—Fourmis des Provinces Argentines

de Sante Fe, Catamarca, Santa Cruz, Cordoba et Los Andes. (Com. Mus. Nac. Hist. Nat. Buenos Aires, ii, p. 149-168, ill.)

SPECIAL NOTICES.

Acta Societatis Entomologicae Serbo-Croato-Slovanae. Volume one, number one of the new publication has just been received. As the titles and most of the text are in Russian, no records will be made in this bibliography.

Biologie der Tiere Deutschlands. Herausg. von Paul Schulze. Lief. 23, Th. 41: Strepsiptera von W. Ulrich. 103 pp., ill. This work should prove useful to students of this order.

Lepidopterologische Rundschau. This is a new journal issued with the Entomologischer Anzeiger published by Adolf Hoffmann, Wien.

REVISTA CHILENA DE HISTORIA NATURAL, Volume XXX, 1926. Dr. CARLOS E. PORTER, Director and Editor.—The thirtieth volume of this important publication has recently appeared. It covers 533 pages and contains many illustrations. While articles on different branches of natural history are published in the volume, entomology seems perhaps to hold the principal place, and there are many notes on insects, usually rather short and of diverse character. Insects of a number of different orders are included. While the language for the most part is Spanish, English and French are also used, and the authors are by no means confined to South America. The present volume contains articles by Dr. Walther Horn of Germany and Father Navas of Spain. An interesting feature of the volume is the publication of a number of portraits of naturalists. The present volume contains especially good ones of Dr. R. A. Philippi, Prof. Carlo Emery, Dr. Carlos Spegazzini and Dr. A. Lipschutz. The volume is also of much interest from its department of scientific news, its series of notes from Doctor Porter's correspondence, and from its accounts of the proceedings of the Entomological Society of Chile, of the Chilean Academy of Natural Sciences and of the Chilean Society of Natural History. One must wonder at the indefatigable energy of Doctor Porter and must praise him for this tangible result of his long work.

L. O. HOWARD.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted—Bembidion (Coleoptera, Carabidae) from South America, Africa, Australia, India. Will buy or exchange for North American Species. Howard Notman, 136 Joralemon St., Brooklyn, N. Y., U. S. A.

Pselaphidae desired from all parts of N. A. for study. Will determine for privilege of study or pay cash. Am monographing family. F. C. Fletcher, Dept. of Entomology, Cornell University, Ithaca, N. Y.

Buprestidae—I am making a revisional study of the North American Agrilus, and will be glad to examine any material in this genus collected north of Mexico. W. S. Fisher, U. S. National Museum, Washington, D. C.

Chrysomelidae—Desire to exchange coleoptera, especially in family Chrysomelidae. Send me your offerta in this family and your desiderata in coleoptera. Paul N. Musgrave, 601 Walnut Ave., Fairmont, W. Va.

Wanted—Cicindelidae & Cerambycidae in exchange for local coleoptera. Address Ernest Baylis, 5011 Saul Street, Philadelphia, Pa.

Buprestidae of the world and N. A. Carabidae and Rhynchophora wanted in exchange for other Coleoptera. Will buy rare species. Alan S. Nicolay, 198 Fernwood Ave., Upper Montclair, N. J.

For Exchange.—Cocoons of Actias luna, and Automeris io and Datana ministra and angusii and pupae of Papilio asterias; also coleoptera of China. Mrs. Robert Milde, Lewiston, Minnesota.

Wanted for Cash—Living pupae of P. ajax, cresphontes, rutulus, zolicaon, eurpmedon, Amph. nessus, Sph. abbottii, Ph. achemon pandorus, Sph. Kalmiae, drupiferarum, Smer. cerisyi, Sam. gloveri, californica, etc. Send offer with prices to Max Rothke, 1841 E. Elm Street, Scranton, Pa.

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Wanted—Coleoptera. I wish to purchase correctly named Coleoptera, from North America and Canada. Please send lists. Edwin E. Calder, R. I. College of Pharmacy, 235 Benefit St., Providence, R. I.

Wanted—Names and addresses of collectors of Lepidoptera in southern states, and in all foreign countries. Collectors communicate—Mrs. Elmer Grubb, R. D. No. 1, Fredericktown, Ohio.

Exchange—Columbian butterflies by 100 monthly arrivals, also N. A. pupae and cocoons. Mrs. Emma Kessler, 2 Hylan Blvd., Rosebank, Staten Island, New York.

Will exchange and buy butterflies and beetles.—Eugene Denby, 2128 Pensacola Ave., Chicago, Ill.

Wanted—For cash or exchange—Entomological News, Vols. 8, 9, 10, each complete, and Vol. 11, No. 5; Psyche, Vol. 11, Nos. 1, 3, 4; Vol. 13, Nos. 2, 3, 4; Vol. 14, No. 6; Vol. 16, Nos. 1, 5, 6. Many good items for exchange.—J. E. Hallinen, Cooperton, Okla.

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DIPTERA

894.—**Allen** (H. W.).—Notes on some N. Am. species of Achaetoneura, with a description of one new species (Tachinidae). (Trans., **52**, 187-198, 1 pl., 1926)..... .25

896.—**Cresson** (E. T., Jr.).—Descriptions of new genera and species of diptera (Ephydridae and Micropezidae). (Trans., **52**, 249-274, 1926) ..... .55

ODONATA

898.—**Huggins** (J. R.).—Variations in size of Calopteryx maculata and a proposed new sub species (Argionidae). Trans. **52**, 355-364, 1927 ..... .20

ORTHOPTERA.

893.—**Hebard** (M.).—A revision of the No. Am. genus Belocephalus (Tettigoniidae). (Trans., **52**, 147-186, 2 pls., 1926) ..... .85

897.—**Hebard** (M).—Studies in the Dermaptera and Orthoptera of Colombia. Paper 4. Orthopterous family Tettigoniidae. Trans. **52**, 275-354, 5 pls., 1926 ..... 1.75

899.—**Hebard** (M.).—A remarkable new genus and species of decticid from Liberty County, Florida (Tettigonidae). Trans. **53**, 1-4, 1 col. pl., 1927 ..... .35

GENERAL

895.—**Crampton** (G. C.).—A comparison of the neck and prothoracic sclerites throughout the orders of insects from the standpoint of phylogeny. (Trans., **52**, 199-248, 8 pls., 1926) 1.20

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